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INSTALLATION MANUAL

OCTAVE™
ULTRASONIC BULK WATER METERS

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1.0 GENERAL SAFETY

- Do not install, operate or maintain this flow meter without reading, understanding and following the factory-supplied instructions. Otherwise, injury or damage may result;
- Read these instructions carefully before beginning installation and save them for future reference;
- Observe all warnings and instructions marked on the product;
- Consider handling and lifting instructions to avoid damage;
- If the product does not operate normally, refer to the service instructions or contact your local Netafim™ representative;
- There are no operator-serviceable parts inside this product.

2.0 PRODUCT LIABILITY & WARRANTY

This warranty shall be considered as null and void and shall not apply in any of the following events:

1. Where equipment is not used or has not been installed in accordance with Netafim™'s specifications and installation instructions for the recommended purpose. This Warranty does not extend to repair or replacement of a Netafim™ product or part that results from misuse, negligence, alteration, tampering, use in conjunction with parts, products or service which have not been approved by Netafim™ or improper installation or maintenance of the product;
2. If irrigation water has not been filtered or treated to the levels specified for individual components of the product by Netafim™;
3. Where chemical concentrates are used or applied internally or externally to the product, and cause harm to the product or its components;
4. If operating pressures are greater than those specified by Netafim™ individual components;
5. Where damage, plugging or clogging is caused by insects, rodents or other animals;
6. Normal wear and tear;
7. Any part normally consumed in operation, or which has a normal life, inherently shorter than the specified warranty period, shall not be considered defective merely due to its consumption or failure prior to the end of the warranty period;
8. If failures are caused by any act or event beyond the reasonable control of Netafim™, natural calamities and/or Force Majeure, which may include, but are not limited to hostilities (whether war be declared or not), civil war or strike, rebellion, lockouts or other industrial disputes or actions, acts of God, acts of government or other prevailing authorities or defaults of third parties, storms, temperatures, flooding, snow, landslides, fire, hailstorm, lightning, flood, earthquakes, electrical or power failures or outages or power surges, or damage due to freezing or mechanical damage, failure of energy or water supply;

If a defect in a Netafim™ product is identified by Netafim™ during the applicable warranty period, Netafim™ will repair, replace or refund part or the full cost of the product at purchase price, at its sole option, the product or the defective part. To receive warranty benefits, customers should return defective product or part to the nearest Netafim™ distributor. Netafim™'s warranty does not cover transit damages or spare parts required for routine maintenance.

Netafim™ cannot and does not assume liability for defective parts, or damage caused by products, not manufactured or supplied by Netafim™, even though such products may be used in conjunction with Netafim™ products and customer assumes risk of use of such third party products. Netafim™'s obligation to repair, replace or refund the cost of its products as set forth above is the sole and exclusive warranty given by Netafim™ .

There are no other warranties, expressed or implied, including warranties of merchantability and fitness for a particular purpose and/or warranty of non-infringement. Netafim™ will not be liable to any party in strict liability, tort, contract, or any other manner for damages caused or claimed to be caused as a result of any design or defect in Netafim™'s products. In addition, Netafim™ shall not be liable, and customer and/or any third party shall not be entitled to recover from Netafim™, for any direct, general, special, incidental, consequential, indirect, punitive, or exemplary damages of whatsoever nature and type (including, without derogating from the generality of the foregoing, losses or damages caused by shutdowns or service interruptions, loss of use, non-operation of the products or any equipment, loss of information, loss of power or cost of replacement power, loss of profits or revenue, loss of contracts, loss of capital inventory or use charges, cost of purchased or replacement power, interest charges or cost of capital or claims of customer's clients or any third party) even if Netafim™ is aware or should have been aware of the possibility of such damages. In no event shall Netafim™'s liability exceed the purchase price of Netafim™ products.

This warranty extends only to the original dealer / installer of the Netafim™ product Netafim™ warranty duration apply from the delivery date to such dealer / installer. Netafim™ reserves the right to alter, modify or redesign its products, pricing and this warranty at all times without creating any liability for the obsolescence of customer inventory or such parts or products.

This warranty shall be subject to, and shall be exclusively by, the Laws of Australia and New Zealand, to the exclusion of its conflict of law rules. Any dispute arising out of or in respect of this warranty shall be subject to the jurisdiction of the courts in Australia and New Zealand.

3.0 ITEMS INCLUDED WITH ORDER

- One Octave™ ultrasonic flow meter, size as indicated on the packaging box, pieced together into a complete compact system (flow tube plus electronics);
- One output module, either digital or analog (based on the customer's order).

4.0 SUPPLIED DOCUMENTATION

- Condensed installation and user manual;
- Report of factory meter settings;
- Certificate of calibration data.

5.0 UNPACKING & INSPECTION

- This product has been thoroughly inspected and tested before shipment and is ready for operation;
- After carefully unpacking the meter, inspect for shipping damage before attempting to install. If any indication of mechanical damage is found, immediately contact the responsible transportation service and your local Netafim™ representative.

6.0 SYSTEM DESCRIPTION & MEASUREMENT METHOD

- The Octave™ measurement method is based on an ultrasonic, transit-time, dual-beam sensor which determines the length of time it takes an ultrasonic sound wave to travel the distance between the two sensors located on the meter's body. The two sensors function as both the sender and the receiver, each one alternating these functions so that the ultrasonic wave travels both with and against the direction of the flow. Since the ultrasonic wave travels slower against the flow than with the flow, the time difference of two waves traveling with and against the flow leads to determining the velocity of the water;
- The Octave™ ultrasonic flow meter is a battery-powered precision flow meter designed for linear, bidirectional flow measurement of water;
- Flow measurement values can be transferred through the standard digital or analog output;
- The Octave™ can be set up for a wide range of applications.

7.0 MECHANICAL DATA

Maximum Working Pressure	16 bar
Liquid Temperature	0.1 up to 50°C
Precision Class	ISO 4064 rev.2005, Accuracy class 2
Configuration	Compact - The display is built in to the unit
Power Source	2 D size Li-battery - 10 years life time
Environmental Protection	IP 68, Ambient operation temperature: -25°C up to +55°C
Display Units	Multi line 9 digit LC display (Flow rate and volume units are programmable)
Volume Display Options	1. Net (Forward less reverse) 2. Forward only 3. Forward and reverse alternating
Outputs (optional)	4 - 20mA (powered loop) Dual digital pulses process (open collector) Dry Contact Encoder output
Coupling Threads (only 2")	BSP, NPSM
Connections	Flanges according to ISO, BS 10 and ANSI 150
Severity Levels	Environmental class C, mechanical class M1 Electromagnetic environment class EI
Pressure Loss	ΔP 16

7.1 TECHNICAL INFORMATION

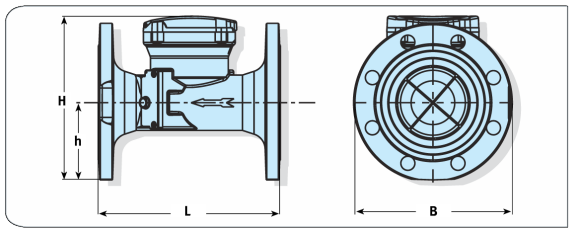
OCTAVE™ DIMENSIONS

Model		Octave™									
Nominal Size	(mm)	40 Threaded	50 Threaded	50	65	80	100	150	200	250	300
	(inch)	1½ Threaded	2 Threaded	2	2.5	3	4	6	8	10	12
L - Length without couplings (mm)		300	300	200	200	225	250	300	350	449	499
W - Width (mm)		113	113	165	185	200	220	285	340	406	489
H - Height (mm)		155	155	194	210	210	223	282	332	383	456
h - Height (mm)		35	35	40	90	90	103	140	165	203	245
Weight (kg) - Cast Iron body			8	9	11.5	13	15	32	45	68	96
Weight (kg) - Polymer body		1.4	1.45								

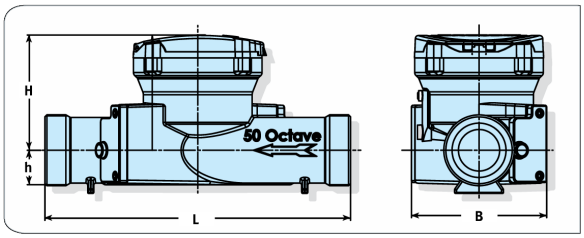
STAINLESS STEEL DIMENSIONS

Model		Stainless Steel Meters				
Nominal Size	(mm)	50	80	100	150	200
	(inch)	2	3	4	6	8
L - Length without couplings (mm)		254	305	356	457	508
W - Width (mm)		147	190	229	280	343
H - Height (mm)		165	216	250	276	327
h - Height (mm)		53	90	115	130	162
Weight (kg) - Stainless Steel body		5.5	11.5	17	27	51

FLANGED



THREADED



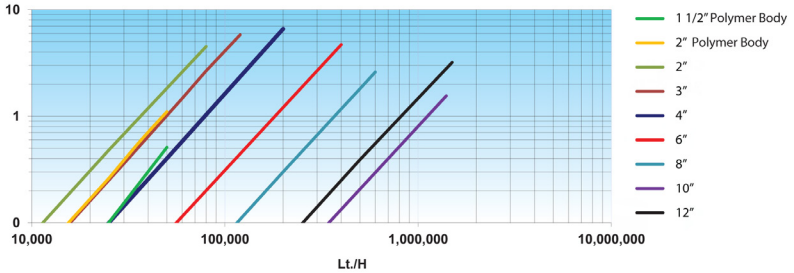
ACTUAL OCTAVE™ PERFORMANCE DATA

Flowrate m³/h	Meter Size								
	DN								
	40 - 1½"	50 - 2"	65 - 2½"	80 - 3"	100 - 4"	150 - 6"	200 - 8"	250 - 10"	300 - 12"
Q4	65	65	80	100	150	320	510	1250	1250
Q3	40	40	50	63	100	250	400	1000	1000
Q2	0.125	0.125	0.150	0.200	0.320	0.600	1.000	3.2	3.2
Q1	0.060	0.060	0.070	0.080	0.100	0.400	0.800	2	2
Starting Flow	0.025	0.025	0.025	0.025	0.025	0.2	0.2	0.5	0.5
R-Q3/Q1	667	667	714	787	1000	625	500	500	500

PERFORMANCE MINIMUM REQUIREMENTS

Flowrate m³/h	Meter Size								
	DN								
	40 - 1½"	50 - 2"	65 - 2½"	80 - 3"	100 - 4"	150 - 6"	200 - 8"	250 - 10"	300 - 12"
Q4	50	50	50	80	125	313	500	1250	1250
Q3	40	40	40	63	100	250	400	1000	1000
Q2	0.256	0.125	0.125	0.200	0.320	0.800	1.280	3.2	3.2
Q1	0.16	0.080	0.080	0.125	0.200	0.500	0.800	2	2
R-Q3/Q1	250	500	500	500	500	500	500	500	500

HEAD LOSS CURVE



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8.0 MECHANICAL INSTALLATION

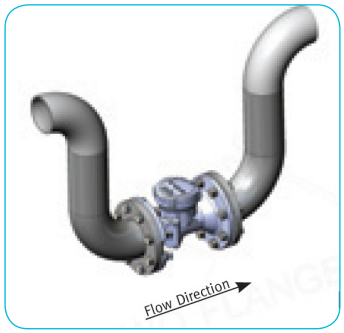
8.1 HANDLING THE FLOW METER

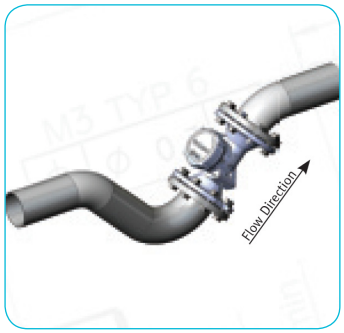
Important handling information:

- Do not lift the Octave™ by the electronic housing.
- Do not carry the Octave™ by its lid.
- Do not place the Octave™ on the electronic housing.
- When handling the Octave™, avoid hard blows, jolts or impacts.

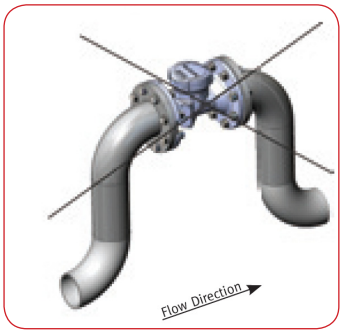
8.2 INSTALLATION: LOCATION & POSITION

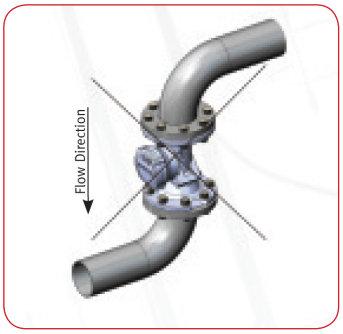
Correct Installation



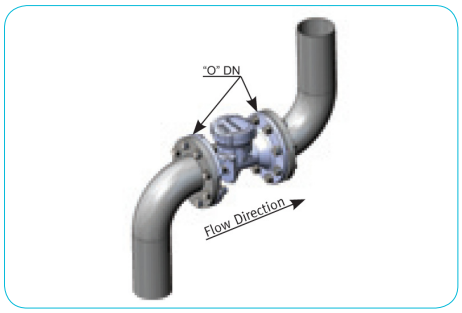


Incorrect Installation

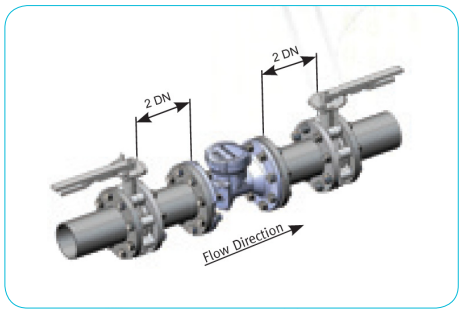




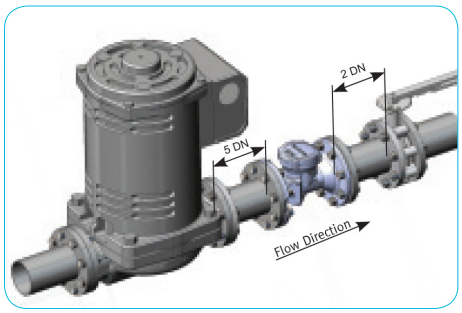
RECOMMENDATIONS FOR ACHIEVING TOP PERFORMANCE



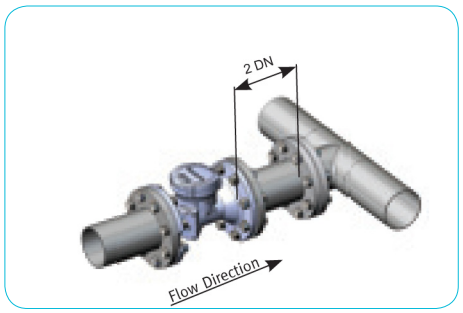
Zero (0) pipe diameters before and after elbows (90˚).



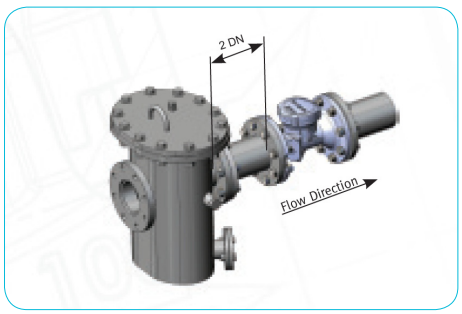
Minimum of two (2) pipe diameters before and after.



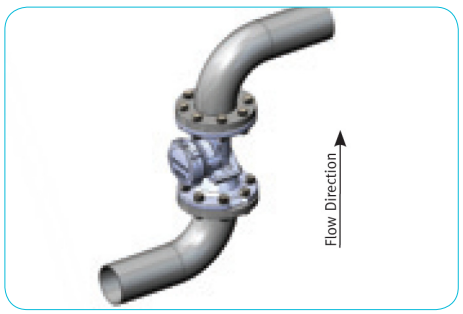
Minimum of five (5) pipe diameters after pumps.



Minimum of two (2) pipe diametres before T connections.



Minimum of two (2) pipe diameters after strainers.



Zero (0) pipe diameters before and after elbows (90˚) in vertical installations.

9.0 NOTES

- For proper flow measurements, the Octave™'s measuring tube should be completely full at all times. Non-wetted sensors show loss of signal. Though this will not cause damage to the meter, it will, however, not measure flow and display zero;
- Flow direction: The Octave™ is a bidirectional flow meter. Note the indicating arrow on the Octave™'s display for forward and backward flows;
- In case of direct sunlight exposure, it is recommended to keep the lid closed, though no direct damage will occur with the lid open;
- Do not expose the Octave™ to excessive vibration. To avoid vibration, support the pipeline on both sides of the meter;
- Ambient working temperature: -25 to +55°C;
- Water working temperature: 0.1 to +50°C;
- To avoid measuring errors due to air in the flow tube, observe the following precautions:
  - Since air collects at the highest point of the system, installation of the flowmeter should be at the lowest point;
  - Always install control valves downstream of the meter in order to avoid cavitation;
  - Never install the meter on a pump suction side in order to avoid cavitation.

10.0 PIPE FLANGES

- Refer to the standard dimensional drawings for flange spacing, accommodating for the thickness of gaskets;
- Install meter in line with the pipe axis. The pipe flange faces must be parallel to each other;
- Permissible length deviation: Lmax - Lmin _ 0.5mm (0.02").

11.0 START-UP

- Check that the meter has been installed correctly;
- Check that the flow rate and volume units are correctly preprogrammed on the display;
- Check that the output module is correctly attached.

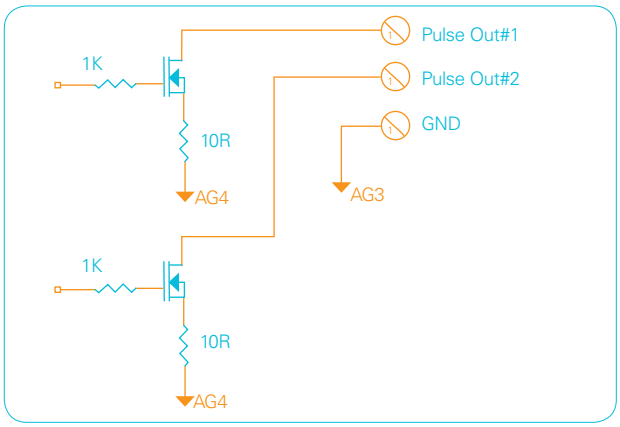
12.0 ELECTRICAL OUTPUTS

12.1 PULSE OUTPUT (DIGITAL)

- The Octave™ is delivered with dual pulse output;
- Pulse Type – open collector that allows current loading of 200mA, and up to 50volt;
- The pulse width is programmable with a maximum resolution value of 1ms.

OCTAVE PULSE OUTPUT MODULE SPECIFICATION

OUTPUTS PROGRAM



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OUTPUTS WIRE COLOURS

Warning - Signal connection polarity is mandatory!

Red	Pulse Out#1
Green	Pulse Out#2
Black	GND

PULSE DURATION TABLE

Pulse per selected quantity	M3	USG	Cuft	A.F
	Maximum Pulse width (ms)			
0.0001	1			
0.001	10			125
0.01	90		3	125
0.1	125	4	32	125
1	125	40	125	125
10	125	125	125	125
100	125	125	125	125
1000	125	125		

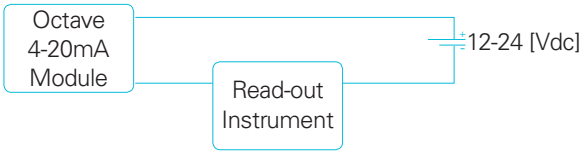
OUTPUT CHARACTERISTICS

Output Type	Open Drain
Cable Length	3 meters (up to a maximum of 100 meters)
Maximum supply voltage	50Vdc
Maximum power load	200mA

12.2 4 - 20mA MODULE (ANALOG)

- The current output is a passive 4-20mA;
- 4mA is always "0" (zero) flow and the 20mA is factory programmable according to the customer requirements;
- If the customer did not specify, the 20mA will be the maximum flow rate.

4 - 20mA OUTPUTS DIAGRAM



OUTPUT CHARACTERISTICS

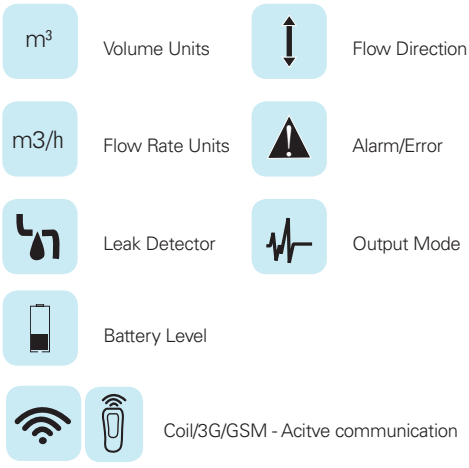
Output Type	4-20mA Passive current output
Supplied Cable Length	3 meters
Loop supply voltage	12 - 24 [Vdc]
Output impedance	25 [mΩ] typ

OUTPUT WIRE COLOURS

Warning - Signal connection polarity is mandatory!

Red	Current loop +
Black	Current loop -

13.0 DIGITAL DISPLAY



14.0 OUTPUT MODULE INSTALLATION

If your Octave™ order includes output module, the following will explain how to attach it to the meter. Output module kit includes (Pic.1)

1. Output module
2. 2 Allen Screws 3mm X 20mm
3. O-ring
4. Sealing cap
5. 3mm Allen key

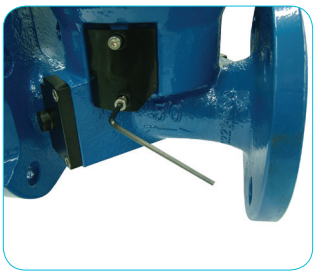
Pic. 1

STAGE 1:

Using the 3mm Allen key, dis-assemble the cover (Pic. 2) from the meter, keep the cover, the screws and the O-ring for future use (Pic.3).

Pic. 2

Pic. 3



STAGE 2:

Place the O-ring in the groove (Pic.4 & 5).

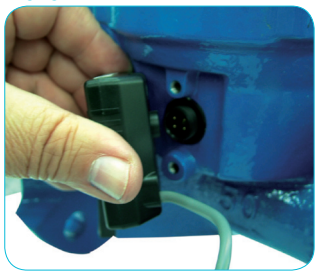
Pic. 4

Pic. 5

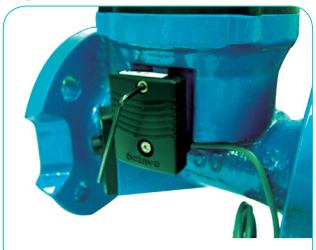
STAGE 3:

Insert the output module into the plug (Pic.6), and tighten the screws with the 3mm Allen key (Pic.7).

Pic. 6



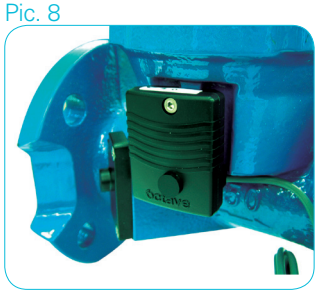
Pic. 7



STAGE 4:

Push the sealing cap to the lower hole of the module (Pic.8) and fix it all the way in with a hammer (Pic.9).

Pic. 8



Pic. 9

NETAFIM AUSTRALIA
213-217 FITZGERALD ROAD
LAVERTON VIC 3026
P 03 8331 6500 | F 03 9369 3865
E NETINFO@NETAFIM.COM.AU

NETAFIM NEW ZEALAND
11 TIMBERLY ROAD
MANGERE AUCKLAND
P 09 256 2551 | F 09 256 2552
E NETINFO@NETAFIM.CO.NZ

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